Proposed Plan for
Site 5
Buckley Air Force Base, Colorado

Department of the Air Force

Air Force Announces Proposed Plan

This Proposed Plan identifies a recommendation for No Further Action at Installation Restoration Program (IRP) Site 5, Fire Training Area #1 (FTA1), located at Buckley Air Force Base (AFB), and provides the rationale for this recommendation. This document is issued by the Department of the Air Force (USAF), the lead agency for site activities, in cooperation with the Environmental Protection Agency (EPA) and the Colorado Department of Public Health and Environment (CDPHE), the support agencies. The USAF, in consultation with EPA and CDPHE, will select a final remedy for the site after reviewing and considering all information submitted during the 30-day public comment period. Therefore, the public is encouraged to review and comment on the information presented in this Proposed Plan.

The USAF is issuing this Proposed Plan as part of its public participation responsibilities under Section 117 (a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 USC § 9617(a) and 40 CFR 300.430(f)(2) and (3) of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This Proposed Plan summarizes information that can be found in greater detail in the Site 5 Supplemental Remedial Investigation (RI) Report (Innovative Technical Solutions, Inc. [ITSI], 2010) and other documents contained in the Information Repository file for this site. The USAF encourages the public to review these documents to gain a more comprehensive understanding of the site.

MARK YOUR CALENDARS

PUBLIC COMMENT PERIOD:
April 14, 2011 – May 13, 2011
The USAF will accept written comments on the Proposed Plan during the public comment period. Comment letters must be postmarked by May 13 and should be submitted to:

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To request an extension send a request in writing to Mr. John Wright at the address indicated above by May 13, 2011.

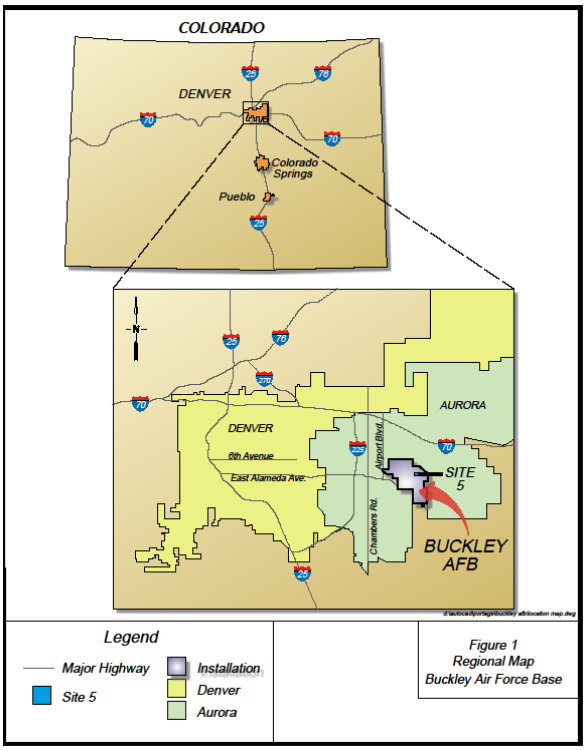
PUBLIC MEETING:
Date: April 21, 2011
Time: 6:00 p.m.
Location: Aurora Chamber of Commerce
14305 E. Alameda Ave, Suite 300
Aurora, CO 80012-2549

The USAF will host a public meeting to explain the Proposed Plan. Oral and written comments will also be accepted at the meeting. The meeting will be held at the location indicated above.

For more information, see the Information Repository at the following location:
Aurora Public Library, Central
14949 E. Alameda Parkway
Aurora, CO 80012
(303) 739-6600
Hours: Monday – Thursday: 9 a.m. to 9 p.m.
Saturday – 10 a.m. to 6 p.m.
Sunday – 12:30 p.m. to 6 p.m.

Site History and Background

Buckley AFB occupies approximately 3,250 acres within the City of Aurora, Colorado, and is located in Arapahoe County, approximately 4.5 miles east of Denver, Colorado (Figure 1). In 1942 and 1943, the federal government purchased 5,740 acres of land outside Denver, and designated it as Buckley Field. Buckley Field was used to train US Army Air Corps B-17 and B-24 bombardiers and armorers, and to conduct basic and arctic training. In 1946, the Army deactivated Buckley Field and allowed the Colorado Air National Guard (ANG) to use the installation. In 1947, the Navy took charge of the installation, renaming it Naval Air Station - Denver until 1960, when the installation again became an ANG base. In October of 2000, Buckley became an active USAF base and is now the home of the 460th Space Wing.



IRP Site 5 (FTA1) is located in the northeast section of Buckley AFB on the north side of Steamboat Avenue and adjacent to Taxiway H (Figure 2). Site 5 has been incorrectly referred to in some historic records as Site 2, but Site 5 is not located near and has no affiliation with Site 2, the Oil Pit, which was closed in 2010.

Buckley AFB fire department training activities were conducted at Site 5 in the late 1940s and early 1950s, covering an approximately five-year time period. Site 5 reportedly consisted of an unlined circular bermed fire training area about 100 feet by 100 feet in horizontal dimensions. Aviation gasoline (AVGAS) was set on fire within the burn area and subsequently extinguished by the trainees. The training frequency and the amount of fuel burned were not documented and are, therefore, unknown.

In later years, Site 5 was used as a "firing-in" range for the alignment of aircraft guns, and currently supports an aircraft engine test facility. Development of the area to an aircraft engine test facility included the placement of fill soils, re-grading of the ground surface, and partial capping of the former burn area with a concrete power check pad. The use of this facility is sporadic and it is largely maintained as an alternative to an existing "hush house," located elsewhere on Buckley AFB. Portions of Site 5 are also currently used as a contractor staging area, with storage trailers and spare vehicles temporarily located adjacent to the check pad area.

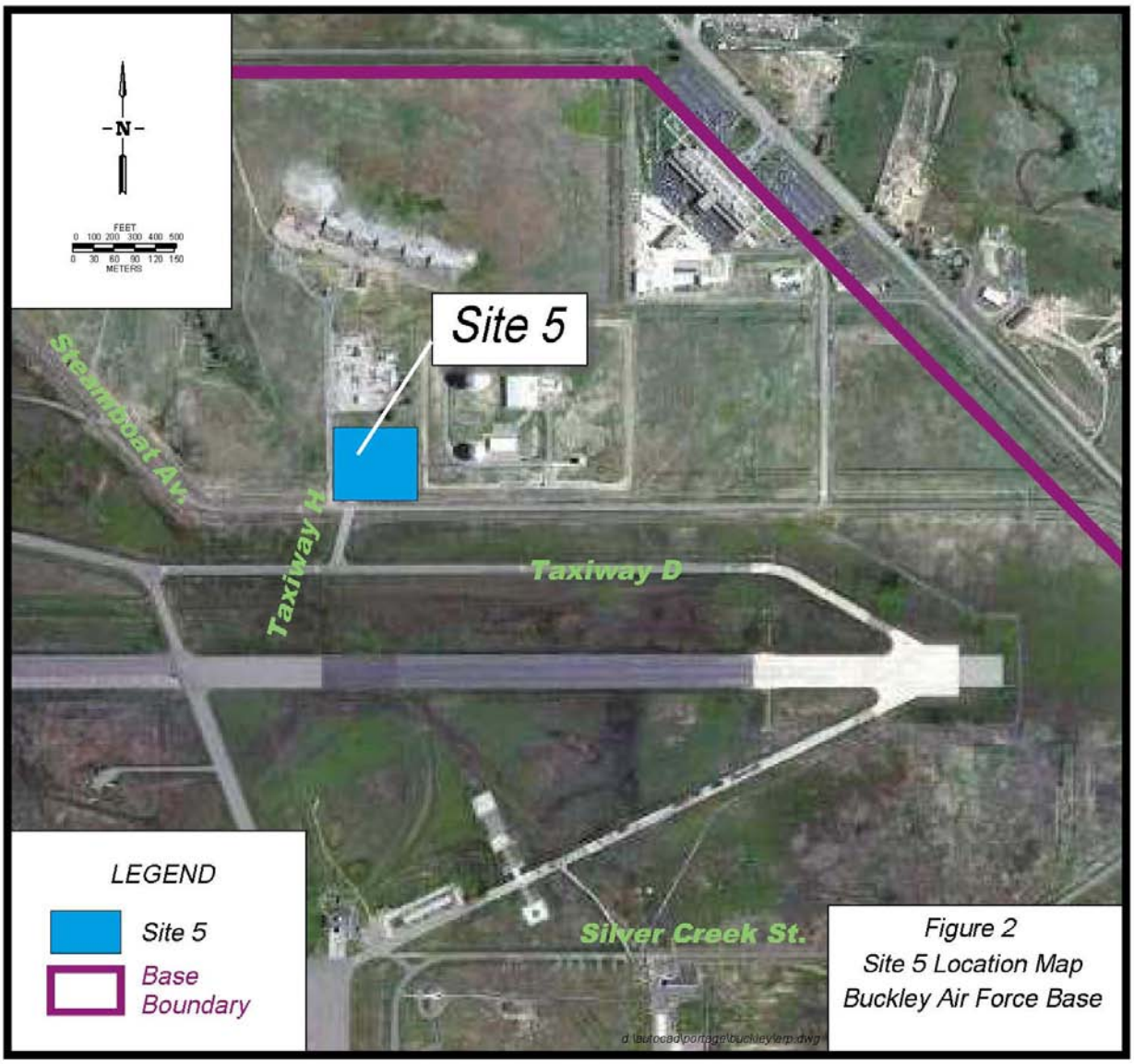
The first study at Site 5 was the Phase I records search, which involved interviewing base personnel, conducting file searches, and inspecting sites with historical hazardous waste activity (Simons, Li & Associates, Inc., 1982). Environmental samples were collected from the site during five investigations, including a Phase II investigation (Dames & Moore, 1986); a RI

(Science Applications International Corporation [SAIC], 1995); a Supplemental RI (Environmental Resources Management [ERM], 1999); four quarters of groundwater sampling that are summarized in Appendices A through D of a Draft Final No Further Response Action Decision Document (NFRADD) (URS Group, Inc. [URS], 2005); and a second Supplemental RI (ITSI, 2010). Prior to the 2010 Supplemental RI, investigations focused on the collection of samples from areas near and adjacent to the FTA1 burn pit area. The Draft Final NFRADD was never finalized due to data gaps identified in these investigations. The USAF chose to conduct the 2010 Supplemental RI to fill data gaps directly within the location of FTA1, with the hope of obtaining site closure without land use controls.

Site Characteristics

Land use in the vicinity of Site 5 includes light industrial use and the nearby runway for Buckley AFB aircraft. There are currently no buildings at Site 5 that are regularly inhabited by base personnel and there are no plans for future buildings at the site.

Sand Creek and East Toll Gate Creek exist along the northeast and southwest sides of Buckley AFB, respectively. Coal Creek



and Murphy Creek flow into Sand Creek from the south, with the confluence of the streams located east of the Base. Both Sand Creek and East Toll Gate Creek originate in the high plains east of Buckley AFB. A water storage reservoir, Lake Williams, exists within the boundaries of the base located about 800 feet northwest of Site 5. Surface water drainage within the immediate vicinity of Site 5 is controlled by land surface topography, which in general slopes to the north and west.

Surficial material at Buckley AFB consists of unconsolidated alluvial and surficial (eolian) deposits overlying the Denver Formation. In general, the Site 5 soil and geologic profile consists of yellowish-brown clay extending from approximately 1 foot below ground surface (ft bgs) to 10 ft bgs. Underlying material is a brown, fine-grained sand and sandy clay that grades to a medium-grained sand.

Groundwater at Site 5 occurs at approximately 10 to 20 ft bgs. The groundwater flow is generally to the northwest, and the hydraulic gradient is approximately 0.001 feet per foot in the vicinity of the former burn pit area (ITSI, 2010).

Investigation Results

Investigations conducted at Site 5 have included the collection of groundwater, soil, and soil gas samples. The following sections summarize the results.

Groundwater. Initial groundwater sampling included installation of one well downgradient of Site 5 (SAIC, 1995). Results showed no detections of volatile organic compounds (VOCs) or semi-volatile organic compounds (SVOCs). Fluoride, nitrate, and sulfate were detected at concentrations higher than water quality criteria established by the state of Colorado or the maximum contaminant levels (MCLs) established by EPA. However, the 1995 RI report noted groundwater samples contained increased suspended solids, which may have contributed to elevated concentrations of sulfate and other anions detected above their regulatory threshold levels. Based on this, they were not considered to be site-related, and were not included in the sampling program going forward. The regulators concurred with this approach.

In September 2001, two additional groundwater monitoring wells were installed at downgradient and parallel locations with respect to the former burn pit area. A quarterly sampling program was conducted between September 2001 and June 2002 and included the two new wells and the well installed as part of the 1995 RI. The only VOC detected was 1,1,1-trichloroethane (TCA) which was detected in one well at concentrations well below the Colorado Basic Standard for Groundwater (CBSG) (URS, 2005). All three monitoring wells were abandoned in 2004.

During the 2010 Supplemental RI, two temporary wells were installed: one within the fire training area and another adjacent to the power check pad blast deflector wall. The groundwater results were consistent with previous investigations in that no VOCs were detected above the laboratory reporting limits (RLs), CBSGs, or MCLs (ITSI, 2010). Based on the groundwater results from all investigations, no chemicals of concern (COCs) were identified for Site 5 groundwater.

Soil. The 1995 RI included the collection of four soil samples. Results indicated no SVOC detections. Lead was detected above background concentrations for Buckley AFB in one of four samples. A single VOC, methylene chloride, was detected. Methylene chloride was also detected in the laboratory blank indicating it was a laboratory contaminant, not a contaminant

found at Site 5 (SAIC, 1995). Based on the elevated lead in one soil sample, the 1995 RI evaluated lead further in a risk assessment (see Summary of Site Risks section below). Based on the risk assessment finding, lead was not included in the analysis program for subsequent sampling efforts. The regulators concurred with this approach.

The 2010 Supplemental RI included the advancement of four soil borings with samples collected at multiple depths from each. Based on the results of a preliminary Membrane Interface Probe (MIP) investigation which identified areas and depths where contamination was most likely, two borings were advanced within the FTA boundary and two borings were advanced adjacent to the blast deflector wall. No VOCs were detected in any of the samples above laboratory RLs or Colorado Soil Evaluation Values (CSEVs) (ITSI, 2010). Based on the soil sampling results, the 2010 Supplemental RI did not identify any COCs in Site 5 soil.

Soil Gas. EPA defines deep soil gas as soil gas at depths greater than 5 ft bgs. Soil gas surveys were conducted for deep soil gas during the 1995 RI and the 1999 Supplemental RI, and for shallow soil gas during the 2010 Supplemental RI. During the 1995 RI, hydrocarbons were not detected in any of the seven soil gas samples, which were taken from approximately 6 ft bgs. Although some VOCs were detected, these samples did not exceed deep soil gas screening concentrations for vapor intrusion or indoor air quality (URS, 2005).

During the 1999 Supplemental RI, VOCs were detected in 13 of 34 soil gas samples at depths of about 7 ft bgs. Maximum soil gas concentrations of tetrachloroethylene (PCE) at 170 (micrograms/cubic meter) $\mu g/m^3$ and trichloroethylene (TCE) at 640 $\mu g/m^3$ exceeded EPA's deep soil gas screening concentrations of 81 $\mu g/m^3$ for PCE and 2.2 $\mu g/m^3$ for TCE (URS, 2005).

During the 2010 Supplemental RI, eleven additional soil gas samples were taken from a depth of 4 ft bgs. In four samples, PCE concentrations ranging from 20 $\mu g/m^3$ to 258 $\mu g/m^3$ exceeded EPA's screening concentration for shallow soil gas of 8.1 $\mu g/m^3$ (EPA, 2002). Vinyl chloride was also detected at 2.5 $\mu g/m^3$ which is below EPA's screening concentration for shallow soil gas of 2.8 $\mu g/m^3$. Due to a laboratory error, the method detection limit (MDL) for TCE was higher than EPA's screening concentration for shallow soil gas, making it difficult to assess whether these samples actually exceeded the screening concentration for TCE (ITSI, 2010). Based on the soil gas sampling results from this Supplemental RI, risks associated with PCE, vinyl chloride, and TCE in soil gas were further evaluated (see Summary of Site Risks section below).

Scope and Role of the Action

This Proposed Plan addresses one of six open IRP sites at Buckley AFB. Activities for this IRP site have been and are currently being performed in accordance with the CERCLA remedial process and, to the extent practicable, the NCP.

Future investigations, remedy selection, and closure for other IRP sites are pending; however, these activities do not impact the closure of Site 5.

Summary of Site Risks

Several risk evaluations have been performed for Site 5 during investigation work. The following summarizes their findings.

Risk Assessment, 1995

The results from the 1995 RI indicated no measurable levels of VOCs and SVOCs

in groundwater and that metals and anions were either at concentrations below water quality criteria or were not site-related (i.e., fluoride, nitrate, and sulfate). As a result, a quantitative risk assessment for the groundwater pathway was not required (SAIC, 1995). The exposure pathway from worker exposure to soil was evaluated for lead, which exceeded the Buckley AFB background level in one sample. The 1995 RI concluded that lead in soil at Site 5 does not pose an unacceptable threat to human health. Soil-gas survey results showed no discernable hydrocarbon contamination and no VOCs above deep soil gas screening concentrations in the vicinity of the suspected burn pit area. As a result, risks from soil gas/vapor intrusion were not evaluated (URS, 2005).

Risk Evaluation, 2007

As part of a recommendation for additional sampling in 2007, potential risks from exposure to VOCs from resulting soil gas were evaluated. Concentrations of VOCs in soil gas at the site exceeded EPA soil gas screening levels, indicating soil gas at Site 5 may have the potential to impact indoor air (EPA, 2002). Maximum concentrations of VOCs in soil gas also exceeded Region 3 Risk-Based Concentrations (RBCs) for inhalation of ambient air. However, the exposure pathway from direct exposure to soil gas was considered incomplete, as VOCs in soil gas are not expected to pose a threat to occasional site workers due to dilution and dispersion of VOCs during transport to ambient air (URS, 2005). In addition, the Region 3 RBCs are not promulgated cleanup standards (URS, 2007). A conservative screening assessment was performed to assess whether VOCs in soil gas might adversely impact indoor air if buildings were ever constructed at Site 5. The assessment concluded that soil gas could adversely impact indoor air under site-specific conditions. However, because site-specific information was not available (i.e., there are no buildings at the site), conservative default values were used in the assessment resulting in uncertainty in the assessment findings.

In assessing risks associated with groundwater, no VOCs or SVOCs were detected in groundwater during sampling conducted between 2001 and 2002, with the exception of 1,1,1-TCA in one well at concentrations ranging between 0.46 microgram/liter (µg/L) and 0.68 µg/L. These concentrations were well below the CBSG of 200 µg/L and the EPA Region 3 RBC and Region 9 Preliminary Remediation Goal (PRG) of 3,200 µg/L. Therefore, the 1,1,1-TCA concentrations in groundwater were not considered a threat to human health (URS, 2007).

Risk Evaluation, 2010

The 2010 Supplemental RI filled existing data gaps by collecting soil, groundwater, and soil gas samples within the FTA1 area and clarifying previous soil gas survey results. Results from the groundwater and soil sampling indicated VOCs were not detected above screening criteria. These results confirmed the conclusions of prior efforts in that no unacceptable risks from exposure to soil or groundwater at Site 5 were noted.

The 2010 Supplemental RI noted elevated concentrations of three VOCs in soil gas: PCE, vinyl chloride, and TCE. In order to evaluate risks associated with these VOCs, the maximum detected concentrations for each were used to evaluate potential risks for exposure to VOCs resulting from vapor intrusion at a hypothetical Site 5 building. The maximum concentrations of PCE, vinyl chloride, and TCE, along with other conservative input parameters, were used to run the Johnson and Ettinger model and estimate risks from

vapor intrusion (EPA, 2004). The vapor intrusion model indicated all noncarcinogenic hazard quotients were less than 1.0 and all carcinogenic risks were less than 10^{-6} for both residential and worker exposure to VOCs at the hypothetical building. These levels fall below acceptable risk and hazard levels mandated by EPA (ITSI, 2010).

It is the USAF's current judgment that the Preferred Remedy of No Further Action identified in this Proposed Plan will protect public health or welfare and the environment from actual or threatened releases of hazardous substances into the environment. EPA and CDPHE concur that No Further Action is the Preferred Remedy. The USAF did not consider other remedy alternatives because all media and risk evaluation results allow for unrestricted use of the site without additional remedial actions.

The results of the remedial investigations and risk evaluation for this site concluded Site 5 has been adequately characterized and the contaminants remaining at this site do not pose unacceptable risks to human health and the environment. The final decision on the proposed action for Site 5 can change based on public comments and new information.

Summary of Recommended Remedy

As a result of the completed investigations and risk evaluations, the USAF has determined that current site conditions allow for unrestricted use of the site and do not pose an unacceptable risk to human health and the environment. Therefore, No Further Action is recommended for Site 5. EPA and CDPHE concur with this recommendation.

Community Participation

The USAF, EPA, and CDPHE provide information on Site 5 to the public through public meetings, the Information Repository for the site, and announcements published in the Buckley Guardian and the Aurora Sentinel of Aurora, Colorado. The USAF, EPA, and CDPHE encourage the public to gain a more comprehensive understanding of the site.

The dates for the public comment period, the date, location, and time of the public meeting, and the location of the Information Repository files, are provided on the front page of this Proposed Plan.

The documents referenced in this Proposed Plan are available in the Information Repository.

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Glossary of Terms and Acronym List

Specialized terms and acronyms used in this Proposed Plan are defined below:

AFB	Air Force Base
ANG	Air National Guard
AVGAS	Aviation gasoline
bgs	Below ground surface
CBSG	Colorado Basic Standard for Groundwater – The CBSGs are standards established by the state of Colorado to protect beneficial uses of groundwater.
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act – the Federal act that establishes federal authority for emergency response and cleanup of hazardous substances that have been spilled, improperly disposed, or released into the environment
COC	Chemical of Concern
CSEV	Colorado Soil Evaluation Value - The CSEVs are constituent concentration screening levels for soil, established by the state of Colorado, based upon residential or worker exposure to soil. Sites with soil constituent concentrations below the residential CSEVs may be used for unrestricted residential purposes.
EPA	United States Environmental Protection Agency
ERM	Environmental Resources Management
ft	Feet
FTA1	Fire Training Area #1
Human health and the environment	A term associated with the evaluation of risk at a remediation site considering risk to human health and risk to the environment, which generally includes plants, animals, and natural resources.
IRP	Installation Restoration Program
ITSI	Innovative Technical Solutions, Inc.
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
MIP	Membrane Interface Probe
µg/L	Microgram per Liter
$\mu g/m^3$	Microgram per Cubic Meter
NCP	National Oil and Hazardous Substances Pollution Contingency Plan (also called the National Contingency Plan) – The outline of procedures, organization, and responsibility for responding to spills and releases of hazardous substances and oil into the environment.
NFRADD	No Further Response Action Decision Document

PCE	Tetrachloroethylene
PRG	Preliminary Remediation Goal
RBC	Risk-Based Concentration
RI	Remedial Investigation
RL	Reporting Limit
SAIC	Science Applications International Corporation
SVOC	Semi-Volatile Organic Compound
TCA	Trichloroethane
TCE	Trichloroethylene
USAF	United States Air Force
URS	URS Group, Inc.
VOC	Volatile Organic Compound

References

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U.S. Environmental Protection Agency (EPA). 2002. *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance)*. November.

EPA. 2004. Johnson and Ettinger (1991) Model for Vapor Intrusion into Buildings. Version 3.1. February.

USE THIS SPACE TO WRITE YOUR COMMENTS

Your input on the Proposed Plan for Site 5, Fire Training Area #1, at Buckley AFB in Aurora, CO is important to the USAF. Comments provided by the public are valuable in helping the USAF select a final cleanup remedy for the site.

You may use the space below to write your comments, then fold and mail. Comments must be postmarked by May 13, 2011. If you have questions about the comment period, please contact John Wright at (307) 773-4147. Those with access to email may submit their comments to the USAF at the following address: John.Wright@warren.af.mil.

Name: _____

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City: _____

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